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U.S. Serial No. 09/543,480
Attorney Docket No. 20004/36

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Srinivasan
U.S. Serial No.	:	09/543,480
Filed	:	April 6, 2000
Title	:	Multi-Band Spectral Audio Encoding
Art Unit	:	2684
Examiner	:	Unknown

PETITION TO MAKE SPECIAL UNDER 37 C.F.R. § 1.102

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Applicant hereby requests that the above-referenced new application be granted special status for examination under the provision of 37 C.F.R. § 1.102 and M.P.E.P. § 708.02 (VIII). This application has not yet received any examination by the Examiner.

The $130 petition fee, set forth in 37 C.F.R. § 1.17(h) is enclosed, as required by M.P.E.P. § 708.02 (VIII) (A).

Should the Office determine that all the claims are not directed to a single invention, the applicant will make an election without traverse in order to be granted special status.

A pre-examination search was made as required by M.P.E.P. § 708.02 (VIII) (C). The following area was searched:

class 725, subclass 18

Further, an information disclosure statement was filed on May 3, 2000, a supplemental information disclosure statement was filed on April 11, 2001, and another supplemental information disclosure statement was filed on November 14, 2002.

The art developed in the search and/or already known to the applicant is listed below:

I. Pre-Examination Search

U.S. PATENT DOCUMENTS					
Document Number	**Issue Date**	**Name**	**Class**	**Subclass**	**Filing Date**
5,574,962	11/12/1996	Fardeau et al.	455	2	12/20/1994
5,581,800	12/03/1996	Fardeau et al.	455	2	06/07/1995
5,612,729	03/18/1997	Ellis et al.	348	2	06/07/1995
5,787,334	07/28/1998	Fardeau et al.	455	2	09/27/1996
6,421,445	07/16/2002	Jensen et al.	380	253	06/08/1998
6,512,769 796	01/28/2003	Sherwood	375	242	05/20/1998

FOREIGN PATENT DOCUMENTS					
Document Number	**Publication Date**	**Country**	**Class**	**Subclass**	**Translation**
0 913 952 A2	06/05/1999	EP	H04B	1/66	

II. Information Disclosure Statement Filed on May 3, 2000

U.S. PATENT DOCUMENTS					
Document Number	**Issue Date**	**Name**	**Class**	**Subclass**	**Filing Date**
4,972,471	11/20/1990	Gross et al.	380	3	05/15/1989
5,450,490	09/12/1995	Jensen et al.	380	6	03/31/1994

5,574,962	11/12/1996	Fardeau et al.	455	2	12/20/1994
5,579,124	11/26/1996	Aijala et al.	386	96	02/28/1995
5,581,800	12/03/1996	Fardeau et al.	455	2	06/07/1995
5,764,763	06/09/1998	Jensen et al.	380	6	03/24/1995
5,787,334	07/28/1998	Fardeau et al.	455	2	09/27/1996

III. Information Disclosure Statement Filed on April 11, 2001

U.S. PATENT DOCUMENTS					
Document Number	**Issue Date**	**Name**	**Class**	**Subclass**	**Filing Date**
2,573,279	10/30/1951	Scherbatskoy	346	37	11/09/1946
2,630,525	03/03/1953	Tomberlin et al.	250	6	05/25/1951
2,766,374	10/09/1956	Hoffmann	250	2	07/25/1951
3,004,104	10/10/1961	Hembrooke	179	2	04/29/1954
3,492,577	01/27/1970	Reiter et al.	325	31	10/07/1966
3,760,275	09/18/1973	Ohsawa et al.	325	31	12/28/1970
3,845,391	10/29/1974	Crosby	325	64	07/15/1971
4,025,851	05/24/1977	Haselwood et al.	325	31	11/28/1975
4,225,967	09/30/1980	Miwa et al.	455	68	01/09/1978
4,238,849	12/09/1980	Gassmann	370	11	12/19/1978
4,313,197	01/26/1982	Maxemchuk	370	111	04/09/1980
4,425,642	01/10/1984	Moses et al.	370	76	01/08/1982
4,512,013	04/16/1985	Nash et al.	370	69.1	04/11/1983
4,523,311	06/11/1985	Lee et al.	370	69.1	11/16/1984
4,677,466	06/30/1987	Lert, Jr. et al.	358	84	07/29/1985
4,697,209	09/29/1987	Kiewit et al.	358	84	04/26/1984
4,703,476	10/27/1987	Howard	370	76	11/06/1986

4,750,173	06/07/1988	Blüthgen	370	111	05/21/1986
4,771,455	09/13/1988	Hareyama et al.	380	6	04/28/1983
4,876,617	10/24/1989	Best et al.	360	60	05/05/1987
4,931,871	06/05/1990	Kramer	358	142	06/04/1988
4,943,973	07/24/1990	Werner	375	1	03/31/1989
4,945,412	07/31/1990	Kramer	358	142	04/25/1989
5,113,437	05/12/1992	Best et al.	380	3	10/25/1989
5,213,337	05/25/1993	Sherman	273	439	07/06/1988
5,319,735	06/07/1994	Preuss et al.	395	2.14	12/17/1991
5,379,345	01/03/1995	Greenberg	380	23	01/29/1993
5,394,274	02/28/1995	Kahn	360	27	04/13/1993
5,404,377	04/04/1995	Moses	375	200	04/08/1994
5,473,631	12/05/1995	Moses	375	202	03/27/1995
5,594,934	01/14/1997	Lu et al.	455	2	09/21/1994
5,629,739	05/13/1997	Dougherty	348	486	03/06/1995
5,687,191	11/11/1997	Lee et al.	375	216	02/26/1996
5,822,360	10/13/1998	Lee et al.	375	200	09/06/1995
5,832,119	11/03/1998	Rhoads	382	232	09/25/1995
5,930,369	07/27/1999	Cox et al.	380	54	09/10/1997
6,035,177	03/07/2000	Moses et al.	455	2	02/26/1996

FOREIGN PATENT DOCUMENTS					
Document Number	**Publication Date**	**Country**	**Class**	**Subclass**	**Translation**
2 170 080	23/07/1986	GB	H04N	5/04	
0 243 561	04/11/1987	EP	H04Q	1/457	
WO 89/09985	19/10/1989	PCT	G10L	5/00	

2 260 246	07/04/1993	GB	H04N	1/00	
0 535 893	07/04/1993	EP	G06F	15/332	
WO 93/07689	15/04/1993	PCT	H04B	17/00	
43 16 297	07/04/1994	DE	G10L	5/00	
WO 94/11989	26/05/1994	PCT	H04N	5/76	
07 059030	03/03/1995	JP	H04N	5/60 7/15	Abstract
2 292 506	21/02/1996	GB	H04N	1/00 9/00	
09 009213	10/01/1997	JP	H04N	7/04	Abstract

OTHER DOCUMENTS
"Digital Audio Watermarking," Audio Media, January/February 1998. pp. 56, 57, 59, and 61
Namba, S. et al., "A Program Identification Code Transmission System Using Low-Frequency Audio Signals," NHK Laboratories Note, Ser. No. 314, Mar. 1985.
Steele, R. et al., "Simultaneous Transmission of Speech and Data Using Code-Breaking Techniques," The Bell System Tech. Jour., Vol. 60, No. 9, pp. 2081-2105, Nov. 1981
International Search Report, dated 08/27/1999, Application No. PCT/US98/23558
International Search Report, dated 08/18/2000, Application No. PCT/US00/03829

IV. Information Disclosure Statement Filed on November 14, 2002

FOREIGN PATENT DOCUMENTS					
Document Number	**Publication Date**	**Country**	**Class**	**Subclass**	**Translation**
2 260 246	07/04/1993	GB	H04H 1	00	
WO 96/38927	05/12/1996	PCT	H04B 1	66	Abstract

As required by M.P.E.P. § 708.02 (VIII) (D), the documents in the pre-examination search are being made of record in the application by the filing of an information disclosure concurrently herewith. One copy of each of the documents in the pre-examination search is attached hereto for the convenience of the officer reviewing this petition. Copies of the remaining documents are not enclosed herewith because they were previously submitted with information disclosure statements to the Patent Office.

Applicant submits that the claimed subject matter is patentable over the above-referenced disclosures. For example, none of the disclosures disclose or suggest a system for adding an interference-resistant, inaudible code to an audio signal comprising a sampler configured to sample the audio signal at a sampling rate to generate a plurality of short blocks of sampled audio with each short block having a duration less than a minimum audibly perceivable signal delay, a processor configured to combine the plurality of short blocks of into a long block having a predetermined minimum duration, a frequency transformation configured to transform the long block into a frequency domain signal comprising a plurality of independently modulatable frequency indices, a frequency selector configured to select a neighborhood of frequency indices so that the frequency difference between a lowest index and a highest index within the neighborhood is less than a predetermined value, and an encoder configured to modulate two or more of the indices in the neighborhood to make a selected one of the indices an extremum while keeping the total energy of the neighborhood constant.

Scherbatskoy, U.S. Patent No. 2,573,279, discloses a system for determining the listening habits of users of wave signal receivers that receive sub-audible program identification signals modulated to corresponding programs. *See, e.g.,* col. 4, line 55 to col. 5, line 44. Scherbatskoy does not disclose, among other things, sampling an audio signal at a

sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Tomberlin et al., U.S. Patent No. 2,630,525, disclose a system for transmitting and receiving coded entertainment programs that incorporates a special coding signal by superimposing a plurality of different supersonic or sub-sonic signals with an audio signal. *See, e.g.,* col. 2, line 53 to col. 3, line 15. Tomberlin et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Hoffmann, U.S. Patent No. 2,766,374, discloses a system for determining popularity ratings of different transmitted programs that transmits coded signals as supersonic components of an audio signal. *See, e.g.,* col. 2, line 37 to col. 3 line 20, and col. 3, lines 37-65. Hoffmann does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Hembrooke, U.S. Patent No. 3,004,104, discloses a method and apparatus for encoding an audio signal by introducing a particular code by varying a particular narrow frequency band for varying periods of time. *See, e.g.,* col. 1, lines 42-49. Hembrooke does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the

plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Reiter et al., U.S. Patent No. 3,492,577, disclose an audience rating system that adds a code-carrying sub carrier signal to the audio portion of a program to be rated by frequency modulating a sub carrier signal with a coded signal. *See, e.g.,* col. 2, lines 17-30, and col. 2, line 69 to col. 3, line 30. Reiter et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Ohsawa et al., U.S. Patent No. 3,760,275, disclose a monitoring system for automatic telecasting or radio broadcasting that transmits a signal containing information (i.e., the "monitoring" signal) related to a particular program (i.e., the "ordinary" signal) by inserting the monitoring signal into a portion removed from the original signal. *See, e.g.,* col. 4, lines 33-44. Ohsawa et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Crosby, U.S. Patent No. 3,845,391, discloses a system for encoding an audio signal by inserting an ancillary code to a narrow frequency "notch" at a fixed predetermined frequency where a portion of the original audio signal is deleted. *See, e.g.,* Abstract, and col. 2, lines 1-17. Crosby does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long

block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Haselwood et al., U.S. Patent No. 4,025,851, disclose a video encoding system that adds an ancillary code to non-viewable portions of video broadcasts (e.g., scanning lines located in the vertical interval). *See, e.g.,* col. 4, line 60 to col. 5, line 4. Haselwood et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Miwa et al., U.S. Patent No. 4,225,967, disclose a broadcast acknowledgement method and system that removes a frequency band of a voice signal of a broadcast program, and superimposes a digital information signal on the voice signal at the frequency band. *See, e.g.,* Abstract, col. 2, lines 64-67, and col. 5, lines 19-25. Miwa et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Gassmann, U.S. Patent No. 4,238,849, discloses a method and a system for transmitting a normal message and an additional message on a carrier wave over a single transmission channel of a predetermined bandwidth by imposing a delay to the normal message. *See, e.g.,* Abstract, and col. 2, lines 11-34. Gassmann does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Maxemchuk, U.S. Patent No. 4,313,197, discloses a signal processor for spread spectrum multiplexing of speech signals and nonspeech signals by delaying the speech signals. *See, e.g.,* Abstract, and col. 2, lines 39-63. Maxemchuk does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Moses et al., U.S. Patent No. 4,425,642, disclose a co-channel communication system for simultaneously transmitting a digital data signal with a communications medium signal (e.g., a telephone voice or television video) by converting the data signal into very low multi-frequency signals, and transmitting the data signal and the medium signal over the same bandwidth. *See, e.g.,* Abstract, and col. 1, lines 50-66. Moses et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Nash et al., U.S. Patent No. 4,512,013, disclose a receiver for recovering a signal having speech and data simultaneously transmitted over an analog channel. An entire modulated data signal is multiplexed within a portion of a normal analog speech signal frequency band where the speech signal is present and the signal power density characteristic of the speech signal is at a low level. *See, e.g.,* Abstract, and col. 2, lines 12-18. Nash et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Lee et al., U.S. Patent No. 4,523,311, disclose a receiver for recovering a simultaneous transmission of a speech signal and a data signal over an analog channel. The speech signal includes a predetermined power density characteristic over a bandwidth of the analog channel, and the data signal is in a portion of the bandwidth where the power density characteristic of the speech signal is at a minimum level. *See, e.g.,* Abstract, and col. 1, lines 13-32. Lee et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Lert, Jr. et al., U.S. Patent No. 4,677,466, disclose a broadcast program identification method and apparatus by extracting program identifying signatures from a video and/or audio signal. *See, e.g.,* col. 2, line 60 to col. 3, line 5. Lert, Jr. et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Kiewit et al., U.S. Patent No. 4,697,209, disclose methods and apparatus for automatically identifying programs viewed or recorded by extracting a signature of a video signal. *See, e.g.,* Abstract, and col. 5, lines 56-63. Kiewit et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Howard, U.S. Patent No. 4,703,476, discloses a system for encoding an audio signal by using two separate notch frequencies for the upper frequency (i.e., the mark) and the lower

frequency (i.e., the space) portions of an encoded audio signal. *See, e.g.,* Abstract, and col. 2, line 40-65. Howard does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Blüthgen, U.S. Patent No. 4,750,173, discloses a method for transmitting audio information and additional information in digital form by replacing one or a plurality of least significant bits in every n^{th} code word of the audio information with data bits of the additional information. *See, e.g.,* Abstract, col. 1, lines 6-15, and col. 2, lines 9-28. Blüthgen does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Hareyama et al., U.S. Patent No. 4,771,455, disclose a scrambling apparatus for transmitting a signal series in which an audio signal is scrambled as an ordinary audio signal by inserting a scrambling signal into a main signal in a predetermined period. *See, e.g.,* Abstract, col. 2, lines 48-68, and col. 5, lines 61-65. Hareyama et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Best et al., U.S. Patent No. 4,876,617, disclose an apparatus for labeling signals with identification information by inserting the identification information into two narrow notches between semi-tones in the tonic scale. *See, e.g.,* Abstract, and col. 2, lines 17-31. Best et al.

do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Kramer, U.S. Patent No. 4,931,871, and Kramer, U.S. Patent No. 4,945,412 (a continuation-in-part of Kramer '871) both disclose a method and system for identification and verification of TV and/or radio broadcasted program segments that mixes sub-audible codes with conventional audio of the program segments. *See, e.g.,* Kramer '871, Abstract, and col. 7 line 61 to col. 8, line 32; Kramer '412, Abstract, and col. 9, line 61 to col. 10, line 44. Neither Kramer '871 nor Kramer '412 discloses, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Werner, U.S. Patent No. 4,943,973, discloses a communication system that superimposes a spread-spectrum signature signal to an information signal with an adder. *See, e.g.,* col. 3, lines 29-61, and col. 5, lines 42-64. Werner does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Gross et al., U.S. Patent No. 4,972,471, disclose a method for encoding an audio signal by intermittently blanking or punching out time slices (i.e., narrow frequency bands) of the audio signal to insert a start code. *See, e.g.,* col. 3, lines 5-23. Gross et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality

of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Best et al., U.S. Patent No. 5,113,437, disclose a signal identification system that superimposes a code on a signal by eliminating a variable sequence of frequency bands in a bandwidth of the signal to form a sequence of corresponding notches, and inserting a sequence of code signals into the notches. *See, e.g.,* Abstract, and col. 1, lines 44-53. Best et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Sherman, U.S. Patent No. 5,213,337, discloses a system for communication using a broadcast audio signal that encodes the audio signal with tones representing various information by masking the tone by the usual sounds of a television program played at the same time or temporarily adjacently, and has less volume than the program's normal sound effects. *See, e.g.,* col. 2, line 65 to col. 3, lines 26. Sherman does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Preuss et al., U.S. Patent No. 5,319,735, disclose a method to embed a sequence of code symbols in an audio signal by generating a modified code signal with frequency component levels proportional to the frequency component levels of the audio signal at each time instant over a signaling band. The modified code signal is combined to the audio signal.

See, e.g., Abstract, and col. 5, line 55 to col. 6, line 60. Preuss et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Greenberg, U.S. Patent No. 5,379,345, discloses a method and apparatus for the processing of encoded data in conjunction with an audio broadcast by encoding identification and timing signals to an audio signal through an encoder. *See, e.g.,* Abstract, and col. 3, line 43 to col. 4, line 5. Greenberg does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Kahn, U.S. Patent No. 5,394,274, discloses a system that provides protection against the unauthorized copying of recorded material by using inaudible phase modulation to the components of the recorded program material to provide an inaudible copyright identification signal. *See, e.g.,* Abstract, col. 4, lines 59-63, and col. 10, lines 28-39. Kahn does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Moses, U.S. Patent No. 5,404,377 and Moses, U.S. Patent No. 5,473,631 (a continuation of Moses, '377), both disclose a system for simultaneous transmission of data and audio signals by using a perceptual entropy envelope of the audio signal (i.e., time, frequency, and amplitude of the audio signal) such that the data signal is masked by audio

signal. *See, e.g.,* Moses '377, Abstract, and col. 3, lines 27-44; Moses '631, Abstract, and col. 3, lines 25-40. Neither Moses '377 nor Moses '631 discloses, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Jensen et al., U.S. Patent No. 5,450,490, Jensen et al., U.S. Patent No. 5,764,763 (a continuation-in-part of Jensen '490), and Jensen et al., U.S. Patent No. 6,421,445 (a divison of Jensen '763) all disclose a system for encoding an audio signal that adds code signals consisting of sinusoidal waves at pre-selected frequency in a high resolution spectrum to the original audio signal to represent a binary bit and the start and end of an embedded message. *See, e.g.,* Jensen et al. '490, col. 6, line 66 to col. 7, line 42; Jensen et al. '763, col. 6, line 66 to col. 7, line 42; Jensen et al. '445, col. 6, line 66 to col. 7, line 42. None of the Jensen et al. references disclose, among other things, a system for encoding an audio signal by adding code signals consisting of sinusoidal waves at ten pre-selected frequency in a high resolution spectrum to the original audio signal to represent a binary bit and the start and end of an embedded message.

Fardeau et al., U.S. Patent No. 5,574,962, Fardeau et al., U.S. Patent No. 5,581,800 (a division of Fardeau et al. '962), and Fardeau et al., U.S. Patent No. 5,787,334 (a division of Fardeau et al. '800) all disclose a method and apparatus for identifying a program broadcast that adds an inaudible encoded message to the sound signal of the program by inserting the inaudible encoded message into narrow bands of audible frequencies in the sound signal. *See, e.g.,* Fardeau et al. '962, col. 6, lines 1-55; Fardeau et al. '800, col. 6, lines 1-55; Fardeau et al. '334, col. 6, lines 1-50. None of the Fardeau et al. references disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of

samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Aijala et al., U.S. Patent No. 5,579,124, disclose an audio encoding system that modulates a code signal having a predetermined bandwidth with an identification signal having a narrower bandwidth than the predetermined bandwidth to produce an encoded signal, and mixes the encoded signal with an audio signal. *See, e.g.,* Abstract, and col. 3, lines 11-25. Aijala et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Lu et al., U.S. Patent No. 5,594,934, discloses a program verification system that adds channel information to a transmission signal in a time division multiplex format as a modulation signal. *See, e.g.,* col. 6, lines 26-48. Lu et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Ellis et al., U.S. Patent No. 5,612,729, discloses a method and system for producing a signature characterizing an audio broadcast signal by forming a plurality of frequency band values within a respective predetermined frequency band, comparing each of a first group of the plurality of frequency band values with a respective one of a second group of the plurality of frequency band, and forming the signature based upon the comparisons of the first and second groups of the plurality of frequency band values. *See, e.g.,* col. 4, lines 50-67. Ellis et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate

a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Dougherty, U.S. Patent No. 5,629,739, discloses an encoding system that injects ancillary codes into a low energy density portion of the frequency band of a program signal so that the injection frequency is locked to the carrier frequency of the program signal. *See, e.g.,* Abstract, and col. 5, lines 21-29. Dougherty does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Lee et al., U.S. Patent No. 5,687,191, disclose an audio encoding system that combining an auxiliary data signal in a subband-coded compressed digital audio signal without decompressing the data by extracting audio subband samples from a packetized data stream, modulating a data carrier sequence by the auxiliary data signal, and combining the modulated data carrier sequence with the audio subband samples. *See, e.g.,* Abstract, and col. 5, lines 11-23. Lee et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Lee et al., U.S. Patent No. 5,822,360, disclose a method and apparatus for transporting auxiliary data in audio signals by hiding the data in the form of colored noise. *See, e.g.,* Abstract, and col. 2, lines 46-58. Lee et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of

the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Rhoads, U.S. Patent No. 5,832,119, discloses a method for using an input image signal for controlling a system that embeds an N-bit value onto an entire signal through the addition of a very low amplitude encoding signal in the form of pure noise. *See, e.g.,* col. 4, lines 38-44. Rhoads does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Cox et al., U.S. Patent No. 5,930,369, disclose a method for inserting a watermark into data by inserting a narrow band signal representing the watermark into a wideband channel representing the data. *See, e.g.,* col. 6, lines 12-25. Cox et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Moses et al., U.S. Patent No. 6,035,177, disclose a system for simultaneous transmission of data and audio signals by using a perceptual entropy envelope of the audio signal (i.e., time, frequency, and amplitude of the audio signal) such that the data signal is masked by audio signal. *See, e.g.,* col. 4, lines 48-67, and col. 7, lines 2-7. Moses et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

Sherwood, U.S. Patent No. 6,512,769, discloses a method and apparatus for encoding data into an audio signal and subsequently extracting the data signal by choosing a portion of the audio signal to insert the data signal, identifying an audio signal length segment correspond to the length of the data signal, segmenting the signal length segment into a series of subsegments with each subsegments corresponding to a bit of the data signal, adjusting the magnitude of each bit of data signal, and combining the data signal and each audio signal length segment in a data signal bit-wise manner. *See, e.g.,* col. 2, lines 13-52, and col. 4, line 62 to col. 5, line 37. Sherwood does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

0 243 561 discloses a tone detection method and system that detects a predetermined frequency tone within signals encoded using linear Prediction Coding (LPC) techniques. *See, e.g.,* p. 3, lines 3-5. 0 243 561 does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

0 535 893 discloses a forward transform processing method for performing a modified discrete cosine transform. *See, e.g.,* Abstract. 0 535 893 does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

0 913 952 A2 discloses a method for embedding a code in an audio signal that filters an audio signal to a frequency band of interest, determines a tonality indication for each of a plurality of segments of the filtered audio signal which indicates the extent to which power is distributed uniformly for frequencies in at least a portion of the frequency band of interest, and inserting at least a portion of the code into one segment of the plurality of segments if the tonality indication indicates a relatively uniform power distribution in the one segment of the plurality of segments. *See, e.g.,* para. [0012]. 0 913 952 A2 does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

43 16 297 discloses a method for an audio signal frequency analysis that divides an input signal into overlapping blocks using a window function, and subjecting the overlapping blocks to a Fourier transformation to obtain a set of coefficients. *See, e.g.,* Abstract. 43 16 297 does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

2 170 080 discloses a digital audio synchronizing system that compensates an audio signal for a time difference between the audio signal and a video signal. *See, e.g.,* Abstract, and p. 1 lines 10-14. 2 170 080 does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

2 260 246 A discloses a method and apparatus for identifying a program broadcast that adds an inaudible encoded message to the sound signal of the program by inserting the inaudible encoded message into narrow bands of audible frequencies in the sound signal. *See, e.g.,* p. 10, line 10 to p. 11, line 28. 2 260 246 A does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

2 292 506 A discloses a method and apparatus for identifying a program broadcast that adds an inaudible encoded message to the sound signal of the program by inserting the inaudible encoded message into narrow bands of audible frequencies in the sound signal. *See, e.g.,* p. 13, line 8 to p. 14, line 27. 2 292 506 A does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

07 059030 discloses a video conference system that provides an output of video data and audio data while synchronizing the video and audio data. *See, e.g.,* Abstract. 07 059030 does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

09 009213 discloses a data transmission system that synchronizes video data and sound data based on measured delay time between the input and output of a buffer memory circuit. *See, e.g.,* Abstract. 09 009213 does not disclose, among other things, sampling an

audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

WO 89/09985 discloses a method and apparatus for processing an acoustic waveform by generating mid-frame sine wave parameters. *See, e.g.,* p. 9, line 3 – 17. WO 89/09985 does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

WO 93/07689 discloses a method and apparatus for identifying a program broadcast that adds an inaudible encoded message to the sound signal of the program by inserting the inaudible encoded message into narrow bands of audible frequencies in the sound signal. *See, e.g.,* p. 10, line 8 to p. 11, line 27. WO 93/07689 does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

WO 94/11989 discloses an audio encoding system that modulates a code signal having a predetermined bandwidth with an identification signal having a narrower bandwidth than the predetermined bandwidth to produce an encoded signal, and mixes the encoded signal with an audio signal. *See, e.g.,* Abstract, and p. 4, line 37 to p. 5, line 15. WO 94/11989 does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long

block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

WO 96/38927 discloses a data broadcasting system that determines a frequency band of the amplitude of an audio frequency signal, compares the amplitude with an audio mask level of the frequency band, removes frequency components from the audio frequency signal in the frequency band if the amplitude of the audio frequency signal is lower than the audio mask level, and inserts data in the frequency band at a level lower than or equal to the audio mask level of the frequency band. *See, e.g.,* Abstract. WO 96/38927 does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

The article "Digital Audio Watermarking" discusses a method to embed information by splitting up the frequency domain into thirty-two (32) bands, and using only thirty (30) bands to hide the information. *See, e.g.,* p. 57. This article also discusses encoding data using perceptual convolution regardless of sampling and bit rates. *See, e.g.,* p. 57. Therefore, the article does not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

The article "A Program Identification Code Transmission System Using Low-Frequency Audio Signals" by Namba et al. discusses a program identification code transmission system using low-frequency audio signals as the code signals. *See, e.g.,* pp. 3-6. Namba et al. do not disclose, among other things, sampling an audio signal at a sample rate to

generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

The article "Simultaneous Transmission of Speech and Data Using Code-Breaking Techniques" by Steele et al. discusses a system for simultaneous transmission of speech and data that uses frequency inversion scrambling. *See, e.g.*, pp. 2081-2085, and pp. 2103-2104. Steele et al. do not disclose, among other things, sampling an audio signal at a sample rate to generate a plurality of short blocks of samples of the audio signal, and generating a long block from the plurality of short blocks to add an inaudible code to a constant-energy frequency band of the audio signal.

CONCLUSION

In summary, the applicant respectfully requests that this application be granted special status for examination under 37 C.F.R. § 1.102 and M.P.E.P. § 708.02 (VIII).

Respectfully submitted,

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